

Title (en)  
UNIVERSAL CONTROL FOR IMPLEMENTING QUANTUM GATES

Title (de)  
UNIVERSELLE STEUERUNG ZUR IMPLEMENTIERUNG VON QUANTENGATTERN

Title (fr)  
COMMANDE UNIVERSELLE POUR IMPLÉMENTER DES PORTES QUANTIQUES

Publication  
**EP 3746954 B1 20230906 (EN)**

Application  
**EP 18706023 A 20180131**

Priority  
US 2018016225 W 20180131

Abstract (en)  
[origin: WO2019152019A1] Methods, systems, and apparatus for implementing a unitary quantum gate on one or more qubits. In one aspect, a method includes the actions designing a control pulse for the unitary quantum gate, comprising: defining a universal quantum control cost function, wherein the control cost function comprises a qubit leakage penalty term representing i) coherent qubit leakage, and ii) incoherent qubit leakage across all frequency components during a time dependent Hamiltonian evolution that realizes the unitary quantum gate; adjusting parameters of the time dependent Hamiltonian evolution to vary a control cost according to the control cost function such that leakage errors are reduced; generating the control pulse using the adjusted parameters; and applying the control pulse to the one or more qubits to implement the unitary quantum gate.

IPC 8 full level  
**G06N 10/40** (2022.01); **G06N 10/70** (2022.01)

CPC (source: EP US)  
**G06N 10/00** (2019.01 - US); **G06N 10/40** (2022.01 - EP); **G06N 10/70** (2022.01 - EP); **H03K 3/38** (2013.01 - US)

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